

REMARKS

By this amendment, Claim 1 has been amended, and no claims have been added or cancelled. Consequently, Claims 1-7, 9-20, and 22-26 are currently pending. All issues raised in the Office Action mailed October 19, 2006 are addressed hereinafter.

INTERVIEW SUMMARY

The Applicants thank the Examiner for the Interview conducted on December 14, 2006. The interview was between Examiner Saeed, his supervisor, and the Applicants' Attorney, Christopher J. Brokaw. Claim 1 that was rejected by the prior Office Action was discussed along with U.S. Patent No. 6,324,533 issued to Agrawal et al. ("*Agrawal*"). In particular, the discussion focused on the amendments to Claim 1 made herein. **Agreement was reached** that the amendments to Claim 1, made herein, render all pending claims patentable over *Agrawal*.

THE PENDING CLAIMS ARE PATENTABLE OVER THE CITED ART

Claims 1-7, 9-20, and 22-26 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by *Agrawal*. It is respectfully submitted that Claims 1-7, 9-20, and 22-26 are patentable over *Agrawal* for at least the reasons provided hereinafter.

CLAIM 1

Claim 1, as amended, recites:

“within a database server, receiving a database statement that specifies frequency criteria and additional criteria,
wherein said frequency criteria specifies at least one criterion that relates to how frequently combinations of items appear together, and wherein said additional criteria do not specify any criterion that relates to how frequently combinations of items appear together; and

performing said frequent itemset operation as part of execution of the database statement to produce results, wherein the results include frequent itemsets that satisfy both said frequency criteria and said additional criteria, and wherein the results do not include frequent itemsets that satisfy said frequency criteria but do not satisfy said additional criteria.”

At least the above-bolded portions of Claim 1 are disclosed, taught, or suggested by *Agrawal*.

Claim 1 is directed towards an approach for performing a frequent itemset operation. According to the approach of Claim 1, a database server receives a database statement that specifies frequency criteria and additional criteria. The frequent itemset operation is performed as part of the execution of the database statement to produce results. Advantageously, the results include frequent itemsets that satisfy both the frequency criteria and the additional criteria, but do not include frequent itemsets that satisfy the frequency criteria but do not satisfy the additional criteria. In this way, frequent itemsets may be identified that satisfy additional criteria in addition to the frequency criteria.

In sharp contrast to the features of Claim 1, *Agrawal* describes an approach where frequent itemsets may be identified that satisfy frequency criteria, but not frequent itemsets that satisfy any additional criteria other than frequency criteria. As a result, numerous elements of Claim 1 are not disclosed, taught, or suggested by *Agrawal*.

Claim 1 recites the element of “within a database server, receiving a database statement that specifies frequency criteria and additional criteria, wherein said frequency criteria specifies at least one criterion that relates to how frequently combinations of items appear together, and wherein said additional criteria do not specify any criterion that relates to how frequently combinations of items appear together.” The Examiner

agreed, after the Interview of December 14, 2006, that *Agrawal* does not disclose, teach, or suggest these elements of Claim 1.

While *Agrawal* does describe a database statement that specifies frequency criteria, *Agrawal* lacks any teaching or suggestion of a database statement that specifies both frequency criteria and additional criteria. To evidence how *Agrawal* fails to show this feature of Claim 1, dependent Claims 9-11 shall now be discussed. Dependent Claims 9-11 are directed towards examples of the additional criteria which may be specified by a database statement; however, none of the portions of *Agrawal* cited to show these dependent claims actually discuss any additional criteria beyond that of frequency criteria as claimed.

Claim 9 recites, “the additional criteria specify a minimum length.” As featured in Claim 9, a minimum length refers to a number of items in a frequent itemset. Col. 5, lines 21-23 and Col. 12, lines 52-55 of *Agrawal* are cited to show Claim 9; however, rather than showing a database statement that specifies frequency criteria and a minimum length, this portion merely discusses finding all combination of items that occur more often in a set of items than a specified number (i.e., frequency criteria). Those combinations of items that do occur more often than a specified number are referred by *Agrawal* as being “supported.” Thus, the phrase “minimum support” by *Agrawal* does not refer to a minimum number of items that all item sets must contain. In other words, the “minimum support” discussed in *Agrawal* refers to no more than the frequency threshold, and it does not refer to how many items a frequent itemset may contain. For example, *Agrawal* states:

“An example of such a rule might be that “30% of transactions that contain beer also contain diapers; 2% of all transactions contain both these items.” Here 30% is called the CONFIDENCE of the rule, and 2% the SUPPORT of the rule. (Col. 5, lines 12-16).

Since *Agrawal's* use of minimum support refers to the minimum frequency a frequent itemset must possess, knowledge of whether a particular frequent itemset has minimum support does not impart knowledge of whether that itemset contains a minimum number of items. For example, one frequent itemset may have a frequency of 90%, but have two items, while another frequent itemset may have a frequency of 15%, and have 30 items. Thus, if a particular frequent itemset needs to have a frequency of at least 50% to have minimum support, knowing that a frequent itemset does have minimum support does not inform one of whether the number of items in the frequency itemset meets or exceeds a minimum number. As a result, the concepts of (a) *Agrawal's* minimum support and (b) a minimum length as claimed in Claim 9 are orthogonal. Consequently, Claim 9 cannot be disclosed, taught, or suggested by *Agrawal* as *Agrawal* lacks any discussion of "additional criteria specify a minimum length" as featured in Claim 9.

Another example of *Agrawal* lacking any discussion of a database statement that specifies additional criteria in addition to frequency criteria is illustrated by Claim 10. Claim 10 specifies that the "additional criteria specify a maximum length." The portion of *Agrawal* cited to show this element (Col. 8, lines 4-6) states, *in toto*:

The schema of F consists of $k+2$ attributes ($item_1, \dots, item_k$, support, len), where k is the size of the largest frequent items and len is the length of the itemset.

Nothing in this portion suggests a database statement that specifies a maximum length. Instead, this portion merely describes storing the frequent itemsets of size K in table F_k . Thus, the term k does not refer to a maximum number of items a frequent itemset may have, but rather simply refers to how large a table needs to be. *Agrawal* lacks any

suggestion of “performing a frequent itemset operation whose results exclude all item sets that include more items than the maximum length specified by the additional criteria” as required by Claim 10. In contrast to the requirements of Claim 10, there is no suggestion in *Agrawal* of performing a frequent itemset operation whose results exclude all item sets that include more items than the maximum length specified by the additional criteria. Consequently, Claim 10 cannot be disclosed, taught, or suggested by *Agrawal*.

As another example of *Agrawal* lacking any discussion of a database statement that specifies additional criteria in addition to frequency criteria, Claim 11 recites the feature that “additional criteria specify a set of one or more included items; and the step of performing the frequent itemset operation includes performing a frequent itemset operation whose results exclude all itemsets that do not include all items in said set of one or more included items.”

Agrawal lacks any teaching or suggestion of these features of Claim 11. For example, the portion of *Agrawal* cited to show the features of Claim 11 (Col. 3, lines 2-16) merely discusses removing certain itemsets from further consideration if they do not meet confidence criteria, which is operationally defined by *Agrawal* as meaning the percentage of all items that include a set of items. Thus, the confidence criteria of *Agrawal* qualifies as frequency criteria as claimed, but does not qualify as “specify a set of one or more included items.” For example, Claim 11 requires that a database statement identify a set of one or more included items, and performing the frequent itemset operation includes performing a frequent itemset operation whose results exclude all itemsets that do not include all items in said set of one or more included items. The cited portion of *Agrawal* lacks any teaching or suggestion of a database statement that identifies a set of items, let alone teaching or suggesting the performance of a frequent

itemset operation whose results exclude all itemsets that do not include all items in specified in a database statement. Therefore, *Agrawal* cannot disclose, teach, or suggest the subject matter of Claim 11.

As shown in the above discussion of Claims 9-11, *Agrawal* lacks any teaching or suggestion of a database statement that specifies both frequency criteria and additional criteria as claimed. Consequently, *Agrawal* cannot disclose, teach, or suggest the element of “within a database server, receiving a database statement that specifies frequency criteria and additional criteria, wherein said frequency criteria specifies at least one criterion that relates to how frequently combinations of items appear together, and wherein said additional criteria do not specify any criterion that relates to how frequently combinations of items appear together” recited in Claim 1.

Claim 1 also recites the feature of “performing said frequent itemset operation as part of execution of the database statement to produce results, wherein the results include frequent itemsets that satisfy both said frequency criteria and said additional criteria, and wherein the results do not include frequent itemsets that satisfy said frequency criteria but do not satisfy said additional criteria.” No portion of *Agrawal* teaches or suggests this element. As explained above, no portion of *Agrawal* teaches or suggests a database statement that specifies frequency criteria and additional criteria, and so logically it follows that *Agrawal* cannot teach or suggest this element as well.

As at least one element in Claim 1 is not disclosed, taught, or suggested by *Agrawal*, it is respectfully submitted that Claim 1 is patentable over *Agrawal* and is in condition for allowance.

CLAIMS 2-7, 9-20, AND 22-26

The Examiner has already indicated that the amendment made herein to Claim 1 renders each of Claims 2-7, 9-20, and 22-26 patentable over the cited art. Further, Claims 2-7, 9-20, and 22-26 all depend, either directly or indirectly, from Claim 1 and include all of the limitations of Claim 1. It is therefore respectfully submitted that Claims 2-7, 9-20, and 22-26 are patentable over *Agrawal* for at least the reasons set forth above with respect to Claim 1. Furthermore, it is respectfully submitted that Claims 2-7, 9-20, and 22-26 recite additional limitations that independently render them patentable over *Agrawal*, e.g., reasons why the subject matter featured in Claims 9-11 and 22-24 is not shown by *Agrawal* were discussed above.

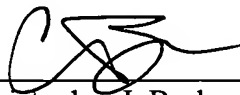
CONCLUSION

It is respectfully submitted that all of the pending claims are in condition for allowance and the issuance of a notice of allowance is respectfully requested. If there are any additional charges, please charge them to Deposit Account No. 50-1302.

The Examiner is invited to contact the undersigned by telephone if the Examiner believes that such contact would be helpful in furthering the prosecution of this application.

Respectfully submitted,

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On December 19, 2006 By 
Susan Jensen